

REMARKS

Prior to this Reply, Claims 1-25 were pending. Through this Reply, Claims 5, 23 and 25 have been amended. No claims have been cancelled or added. Accordingly, Claims 1-25 are now at issue in the present case.

I. Drawings

The Examiner objected to the drawings. Specifically, the Examiner indicated that Fig. 1 should be designated by a legend such as –Prior Art– because only that which is old is illustrated. The Examiner indicated that a proposed drawing correction or corrected drawings are required in reply to the Office Action to avoid abandonment of the application.

In response, Applicant is submitting replacement Figs. 1 and 2 (contained on Replacement Sheets 1-2). Applicant notes that the figures have been numbered consecutively (i.e., the two drawings now bear the language –Fig. 1– and –Fig. 2–, respectively). In addition, Fig. 1 has been designated with the legend –Prior Art–. No new matter has been added. Figs. 1 and 2 constitute all of the drawings of the application.

II. Rejection Under 35 U.S.C. § 112

The Examiner rejected Claims 5 and 25 under 35 U.S.C. § 112. Specifically, the Examiner found that the limitation “said read amplifier” in Claim 5, line 2, lacked antecedent basis. Furthermore, the Examiner found that the limitation “said transmission gates” in Claim 25, line 2, lacked antecedent basis.

In response, Applicant has amended Claims 5, so that it depends from Claim 4. In addition, Applicant has amended Claim 25, so that it depends from Claim 24.

In view of the amendments to Claims 5 and 25, Applicant believes that proper antecedent basis is provided. Accordingly, Applicant submits that the rejection of Claims 5 and 25 under 35 U.S.C. § 112 has been overcome.

III. Allowable Subject Matter

The Examiner indicated that Claims 20-25 were allowable. Applicant believes that such claims are still allowable.

The Examiner objected to Claims 3, 5, 8-11, 13, 14 and 18 as being dependent upon a rejected base claim. However, the Examiner indicated that such claims would be allowable if they were rewritten in independent form to include the limitations of their respective base claims and any intervening claims.

IV. Rejection Under 35 U.S.C. § 103(a)

The Examiner rejected Claims 1, 2, 4, 6, 7, 12, 15-17 and 19 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,754,369 to Balakrishnan (hereinafter “Balakrishnan”) in view of U.S. Patent No. 5,880,614 to Zinke et al. (hereinafter “Zinke”). Applicant respectfully traverses the rejection because the references do not disclose all of the limitations of the claims.

Balakrishnan discloses a head suspension that has an integrated self-shielding trace conductor array for supporting and electrically interconnecting a dual element read/write head to electronic circuitry in a disk drive. Write traces are placed proximately to the read traces and are grounded during data reading operations in order to serve as a read trace electrostatic shield during the data reading operations (Abstract). Balakrishnan is not directed to limiting sensor current in a recording head of a disk drive.

Zinke is directed to a circuit arrangement to evaluate the output signal of an active sensor which is configured as a binary current signal. The circuit arrangement produces a proportional current from the sensor current by way of a current mirror circuit. The current produced by a current mirroring operation is drawn from a stabilized voltage source by way of an ohmic resistance, and a binary voltage signal corresponding to the sensor output signal is generated thereby. The voltage signal is sent to a flipflop which compares the voltage signal with a reference value that is composed of a reference voltage and a hysteresis voltage. The change-over threshold of the flipflop is varied or adapted as a function of the actual sensor current, leakage currents, etc. (Abstract).

Zinke is non-analogous art and does not apply to the present invention. In particular, Zinke does not even mention disk drives. Zinke is not concerned with disk drive read/write devices, disk pre-amplifiers for disk drives, recording heads for disk drives, or read/write currents in such devices.

Indeed, the only example provided by Zinke is that of using the circuit arrangement of Zinke in conjunction with an automobile anti-lock braking system and battery (col. 2, lines 41-65). There is no suggestion in Zinke that the circuit arrangement can be used in conjunction with a disk drive or disk drive recording head. The circuit arrangement of Zinke is inapplicable to disk drive recording heads because of the vastly different technical fields, and electrical/physical tolerances.

In contrast, in one embodiment, the present invention is directed to a read/write device for a disk drive having a pre-amplifier and a recording head. According to an embodiment of the present invention, a read/write device for a disk drive, having a pre-amplifier and a recording head, comprises a write signal path between said pre-amplifier and said recording head, said

write signal path having a write current; a read signal path between said pre-amplifier and said recording head, said read signal path having an induced current related to said write current; and a shunt path in said pre-amplifier to draw a part of said induced current from said read signal path (Claim 1). Clearly, Zinke is non-analogous art in relation to such a read/write device.

Furthermore, Zinke fails to disclose: “a shunt path in said pre-amplifier to draw a part of said induced current from said read signal path,” as required by Claim 1. In Col. 1, lines 53-65 (relied on by the Examiner in rejecting Claim 1), Zinke states:

The special features of the circuit arrangement of the present invention include that *signal currents proportional to the sensor current are produced from the sensor current by way of a current mirror circuit, the current induced by a current mirroring operation is drawn from a (stabilized) voltage source by way of an ohmic resistance*, whereby a binary voltage signal corresponding to the sensor output signal is generated, the voltage signal is sent to a flipflop which has a variable change-over threshold and compares the voltage signal with a reference value composed of a reference voltage and a hysteresis voltage, and the change-over threshold of the flipflop is responsive to the reference value (emphasis added).

In the above passage, Zinke describes a circuit arrangement that uses a current mirror to draw a mirrored current from a voltage source, wherein the mirrored current is proportional to a sensor current. Zinke states: “The sensor current I_S is transformed to an extremely smaller, proportional signal current I_1 by way of the current mirror circuit 2.” (Col. 2, line 66 to Col. 3, line 1). In contrast, according to the claimed invention herein, the shunt path functions to draw a part of the current induced in the read signal path from the read signal path (e.g., to reduce the level of the current in the read signal path and protect the recording head from excess current flow).

Zinke’s circuit arrangement (FIG. 1) does not function as a shunt, as claimed, because the circuit arrangement does not draw the mirrored current I_1 as part of the sensor current I_S . Rather,

the mirrored current I_1 is drawn from the stabilized voltage source U_K (Col. 2, line 66 to Col. 3, line 3). Further, Zinke is not concerned with reducing the level of the sensor current by drawing part of the current using a shunt path. As the mirrored current I_1 is not shunted from the sensor current I_S , the mirrored current I_1 does not reduce the level of the sensor current I_S .

Zinke's current mirror arrangement cannot function in the same manner as the claimed shunt herein. The current mirror is assembled from two transistors. If the transistors are well matched, the output current path of the current mirror will draw a current level the same as that of the input current path. In that case, the ratio of input to output current is equal to one. The ratio of the input to output current can be selected based on the ratio of the transconductances of the transistors. Zinke's current mirror operates as described wherein the sensor current I_S is mirrored to a smaller, proportional signal current I_1 by way of the current mirror circuit 2 (Col. 2, line 66 to Col. 3, line 3). This has nothing to do with the shunt path as claimed. The proportional signal current I_1 is not drawn from the sensor current I_S by a shunt path.

Zinke is also not concerned with capacitive or inductive coupling between a read signal path and a write signal path, and a way to reduce the current coupled into the read signal path to protect the recording head. The current mirror arrangement in Zinke does not perform any such function.

Zinke's concern is providing a circuit arrangement which ensures a reliable identification of the output signal of an active sensor issuing a binary current signal even with unfavorable voltage tolerances and tolerances of structural elements. This has nothing to do with limiting the current in a recording head of disk drive by shunting as claimed, to prevent head damage.

Furthermore, neither of the references provide the requisite motivation to modify or combine the references as proposed by the Examiner. The references are individually complete

and functionally independent for their limited specific purposes and there would be no reason to make the modification proposed by the Examiner. Applicant respectfully submits that the Examiner is improperly using “hindsight” and the teachings of Applicant’s own claimed invention in order to combine references to render Applicant’s claims obvious.

For at least the above reasons, Applicant submits that Claim 1 and the claims that depend therefrom are patentably distinguishable from the combination of Balakrishnan and Zinke.

Claim 15 was rejected for substantially the same reasons as Claim 1. Applicant submits that Claim 15 and the claims that depend therefrom are patentably distinguishable from Balakrishnan and Zinke for reasons similar to those provided with respect to Claim 1.

V. Amendment to Claim 23

Claim 23 was amended to correct a grammatical error. Specifically, Claim 23 was amended to add a period.

VI. Additional Claim Fees

In determining whether additional claim fees are due, reference is made to the Fee Calculation Table (below).

Fee Calculation Table						
	Claims Remaining After Amendment		Highest Number Previously Paid For	Present Extra	Rate	Additional Fee
Total (37 CFR 1.16(c))	25	Minus	25	= 0	x \$18 =	\$ 0.00
Independent (37 CFR 1.16(b))	3	Minus	3	= 0	x \$86 =	\$ 0.00

As set forth in the Fee Calculation Table (above), Applicant previously paid claim fees for twenty-five (25) total claims and for three (3) independent claims. Accordingly, Applicant

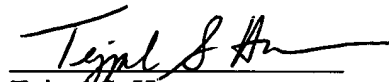
believes that no fees are due. Nevertheless, the Commissioner is hereby authorized to charge Deposit Account No. 50-2198 for any fee deficiencies associated with filing this paper.

VII. Conclusion

Applicant believes that the application appears to be in form for allowance. Accordingly, reconsideration and allowance thereof is respectfully requested.

The Examiner is invited to contact the undersigned at the below-listed telephone number regarding any matters relating to the present application.

Respectfully submitted,



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